



THE CHINESE UNIVERSITY OF HONG KONG  
Institute of Network Coding  
and  
Department of Information Engineering  
*Seminar*



## Wireless Network Coding: Algorithms, Analysis, and Applications

by

**Prof. Alex Sprintson**  
Texas A&M University

**Date : 10 November 2014 (Monday)**  
**Time : 11:00 am -12:00 pm**  
**Venue : Room 833, Ho Sin Hang Engineering Building**  
**The Chinese University of Hong Kong**

**\*\*\*An extended version of this talk will be presented as a 2.5 hour mini-course on  
Wednesday, Nov 12, 2:30-5:15 pm, in SHB 833 \*\*\***

### Abstract

Wireless network coding has the potential to improve the performance of wireless networks by taking advantage of the broadcast properties of wireless medium. The talk will focus on two basic wireless network coding problems, index coding and direct data exchange. We begin by showing a deep connection between the index coding problem, the more general network coding problem, interference alignment as well as the problem of finding a linear representation of a matroid. Then, we will focus on the security aspects of wireless network coding. In particular, we will discuss the problem of secure direct data exchange between mobile clients in the presence of an eavesdropper. We show that this problem has many interesting reformulations, such as designing constrained generator matrices of MDS codes and leads to interesting conjectures in algebraic geometry and abstract algebra.

### Biography

Dr. Sprintson is an Associate Professor with the Department of Electrical and Computer Engineering, Texas A&M University, College Station. From 2003 to 2005, he was a Postdoctoral Research Fellow with the California Institute of Technology, Pasadena. His research interests lie in the general area of communication networks with a focus on network coding and software defined networks. Dr. Sprintson received the Wolf Award for Distinguished Ph.D. students, the Viterbi Postdoctoral Fellowship, and the NSF CAREER award. Currently, he serves as an associate editor of the IEEE Transactions on Wireless Communications. He has been a member of the Technical Program Committee for the IEEE Infocom 2006--2015.

**\*\* ALL ARE WELCOME \*\***